

Quality Assurance/Quality Control Plan

Following is information field crews used for data collection. A field data collection form is attached along with a narrative explanation of the parameters. The following sections describe the field and office methods used and the training that field crews received prior to beginning the survey.

Field Methods:

The habitat, bankfull width and bankfull depth data were collected according to established methods developed by the Timber-Fish & Wildlife Ambient Monitoring Program at the Northwest Indian Fisheries Commission (NWIFC) (*Schuett-Hames et al, August, 1994*). Channel classification was also described according to Timber-Fish & Wildlife methods (*Montgomery and Buffington, 1993*). Pebble count data was collected according to established methods developed by Leopold (*Leopold, 1970*). Methods for collecting the channel bank/terrace characteristics were developed in the field as the survey form was being tested. The survey form also included some qualitative parameters such as adjacent land use and riparian vegetation types. These collection methods were also developed in the field.

Office Methods:

County Environmental Health staff chose Access 7.0 for Windows 95 as the database for storing and analyzing the field data. Spatial data maps were generated utilizing Arcview 3.0. Customized data entry forms that mimicked the field survey form were developed so that the field crews could easily do the data entry. Once the field work started, one day a week was usually set aside for data entry. Data entry responsibility was rotated amongst the crew members. Once a field form had been entered into the database each entry was double-checked to ensure data entry accuracy. As an additional QA/QC check, once all data entry was complete, the project manager went through each field form to verify the accuracy of the entry in the data base.

Training:

Field crew training began in mid-June, 1996. Field training was conducted by Evergreen State College faculty, Tribal Fisheries staff, Northwest Indian Fisheries Commission Ambient Monitoring Program Staff and County staff. The field crews completed a week of day long training before starting the survey. They also completed a woody debris, quality assurance/quality control L(QA/QC) check by the Northwest Indian Fisheries Commission Ambient Monitoring Program staff. The crews surveyed up stream, one crew being responsible for odd numbered reaches and the other being responsible for even numbered reaches. In an effort to ensure consistency and quality of data collection, one reach a week was duplicated by the crews. One

crew completed the data collection during the 1997 field season. This crew received refresher training by the NWIFC prior to beginning the survey.

REACH-SCALE ANALYSIS

Reach Number _____ **Survey Crew** _____ **Date** _____
Location Downstream river mile _____ Upstream river mile _____ Reach length _____
Defining side (left/right) **Defining Characteristic(s)** _____

Bank/Terrace characteristics

Left side	Downstream height _____	Mid-reach height _____
	slope angle _____	slope angle _____
Right side	Downstream height _____	Mid-reach height _____
	slope angle _____	slope angle _____

Note: If bank is notched, provide sketch and label dimensions

Left side	% armored w/large veg. _____	% actively eroding _____
	% human modified (describe) _____	
Right side	% armored w/large veg. _____	% actively eroding _____
	% human modified (describe) _____	

Bank materials

Left side _____
Right side _____

Transition between reaches (this reach and the next one upstream):

Left side:	abrupt _____	gradual _____	distance _____
Right side:	abrupt _____	gradual _____	distance _____

Backfull Width Downstream boundary _____ Reach Midpoint _____

Potential for off-channel rearing habitat high _____ moderate _____ low/none _____

(addition remarks): _____

Channel classification (bedrock/cascade/step-pool/plane bed/pool-riffle/regime/braided)

Channel configuration

Number of pools _____	Number of riffles _____
Total length of pools _____	Total length of riffles _____
Percent of reach in pools _____	Percent of reach in riffles _____
Maximum depth of pool (starting at the downstream end of the reach)	
#1 _____ #2 _____ #3 _____ #4 _____ #5 _____	
Outlet depth of pool	
#1 _____ #2 _____ #3 _____ #4 _____ #5 _____	
Residual depth of pool	
#1 _____ #2 _____ #3 _____ #4 _____ #5 _____	
Pool-forming factor (from manual)	
#1 _____ #2 _____ #3 _____ #4 _____ #5 _____	

Additional Remarks:

PEBBLE COUNTS

(If pebble counts were not done, indicate why)

	#1	#2	#3	#4	#5
>256					
256					
180					
128					
90					
64					
45					
32					
22.6					
16					
11.3					
8					
5.6					
4					
<4					

LEVEL ONE – LARGE WOODY DEBRIS

Individual Pieces

Pieces	Rootwad	logs 10-20 cm	logs 20-50 cm	logs >50 cm
Zone 1				
Zone 2				

Debris Jams ≥ 10 pieces

Individual Pieces

Jam #1				
Jam #2				
Jam #3				
Jam #4				

Riparian vegetation

Left side: _____

Right side: _____

Mid channel bar: _____

REACH SCALE ANALYSIS

Reach number: We will probably start with 1 near the Falls and work upstream. As we will probably have two survey crews, and the second one will start somewhere upstream, we will probably have to have a temporary numbering system, until the entire project is completed. Perhaps we could start with 101 or 1001.

Survey Crew: Last names of crew members

Date: The date started, if done over two days, indicate both dates.

Location: Upstream and downstream boundaries in river miles to the nearest 0.05 miles. We will probably use existing mileage designations, perhaps following previous USGS studies. The reach length will be measured off a map, and could be verified with hip chain measurement.

Defining side: It is anticipated that the reach will be defined by a cut bank or bedrock on one side of the channel or the other. Circle the appropriate side (always done facing downstream). The defining characteristic of the reach will likely be based on length of cut bank, impingement on valley wall, bedrock, etc.

Bank Characteristics: Measure bank height at the two locations using a rod or staff marked off in 10 cm intervals. Lay the rod or staff along the bank perpendicular to the stream and use that surface to determine slope angle. Measurement can be made with an inclinometer or pocket transit. If the bank has an obvious notch, provide a sketch and given dimensions, starting at the edge of the water.

We are also interested in bank stability. There appears to be quite a lot of low bank that is calving off into the river. For each reach, we would like to have some sort of measure of the state of the bank in terms of its propensity to erode. These three categories are not intended to be mutually exclusive or entirely inclusive, so they will not need to add to 100%.

Bank Materials: Describe the nature of the bank material for each side of the river. If you need additional space, use the bottom of the sheet. A brief description is all that is needed, e.g. Left bank – 4 feet of silt/sand over 2 feet of cobbles. Pebble counts will be done for the coarse debris and recorded on the bank of the sheet. Hopefully, because the reaches aren't all that long, each side of the reach will be fairly homogeneous.

Transition: In some cases the reach boundaries are fairly abrupt and in others there is a transition. Boundaries will be placed at the upstream end of the transition zone, and the approximate length of the transition recorded.

Bankfull width: As bankfull discharge is defined as a relatively common flow volume, the bankfull width will probably be determined by vegetation. Cut-bank sides will have a fairly obvious boundary, while the point-bar side may be a bit more vague. Make the measurement with

a tape, perpendicular to the flow direction. We are more interested in basin trends, than the measurements at any given reach.

Potential for off-channel rearing habitat: look for features of the channel that would allow juvenile fish to get out of the main current during high flows (more from Cave). Check one option and briefly describe if necessary.

Channel classification: (from TFW report by Montgomery and Buffington); circle one type. You will be provided with a handout that describes the characteristics of each type.

Channel configuration: Count number of pools and number of riffles and estimate their cumulative lengths. Divide lengths for pools and for riffles by reach length to determine percentage. These two components should sum to 100% - if it is not a pool, it's a riffle. Record maximum depth for each pool, starting from downstream end of reach. Measure residual pool depth: max. depth minus outlet depth; and pool-forming factor based on system from ambient monitoring program. A copy of the characteristics will be provided.

Additional remarks: Note things like islands or mid-channel bars, adjacent land use (fluvial/human interactions), pollution sources, etc.

Pebble counts: 100 cobbles, one or two per reach on point bars, data recorded on the back of the form. Analysis done following guidelines in Leopold (1970).

Large Woody Debris: level 1 survey; we will provide you with a handout from the Ambient Monitoring Handbook that summarizes what you need to include.

Riparian vegetation: Briefly describe the nature of the vegetation.

The county may decide that they want photographs taken for each reach.